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LETTER TO THE EDITOR

Covid-19 pandemic and digital transformation in critical care units☆

Pandemia de Covid-19 y transformación digital en Cuidados Intensivos

To the Director,

Over the last few decades, the healthcare system has faced serious health crisis like the toxic syndrome or the H1N1 virus epidemic until the current COVID-19 pandemic. All of these crises share common features like uncertainty and a sensation of panic; also, the huge number of people affected by them—most of them mildly affected—puts the efficacy and organization of the entire healthcare system to the test. Also, a high percentage of these patients requires hospitalization due to acute hypoxemic respiratory failure. Up to 10% of these patients can end up requiring intensive care unit (ICU) admission. This requires more critical beds, electromedical resources, and skilled personnel available to cover these needs. Buying ventilators is a huge economic effort. However, increasing the number of critical beds or having more personnel is not easy to improvise. On the other hand, studies like the CESAR trial[1] confirmed that mortality rate is lower when the patient is treated in a specialized ICU with a high volume of admissions. In the light of the current situation, modern technology based on digital transformation can help. What are the benefits we could expect from information systems at the ICU setting?

The most important one is improving healthcare for the patients. Obtaining huge amounts of clinical, radiological, and laboratory data—without manual intervention—in a complete, reliable, shared, and real-time way speeds up the therapeutic decision-making process and does so in an even safer way. Also, it allows us to assess the impact and safety of the therapeutic approach used.[2]

It also reduces the nursing team workload and the elements of contagion. Electronic charts and checklists filled in through real-time automatic data mining avoid errors of data transcription and allow nurses to dedicate more time to the patients. Also, suppressing paper and other devices eliminates possible sources of infection.

Acquisition of new knowledge. One of the characteristics of the current COVID-19 pandemic is not knowing the natural history of the disease. Big Data techniques are essential here too to facilitate the creation of patients' profiles including their individual traits, anticipate the progression of the disease, and predict the possible responses to the different therapeutic approaches used.[3] However, we should remember that Big Data means having a great amount of reliable and exploitable data. This is impossible without computer applications specifically designed the ICU setting. It seems counterintuitive to not use such knowledge to deal with the current and future situations.

Tele-ICU. It was born as a response to the lack of intensivists in order to support units lacking specialists or with part-time specialists, not to replace physical beds at the ICU. Technological advances have exceeded their use as an element of equality thanks to the possibility of remote intercommunications among different units with different degrees of knowledge and experiences. This allows very complex patients hospitalized in smaller and polyvalent units to benefit from the experience gained in more specialized units.[4] Similarly, these systems can turn other hospital areas into critical and semi-critical areas supervised by expert personnel in a model of *ICU without walls*.[5]

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References

1. Peek G, Mugford M, Tiruvoipati T, Wilson A, Allen E, Thalanany MM, et al. Efficacy and economic assessment of conventional ventilatory support versus extracorporeal membrane oxygenation for severe adult respiratory failure (CESAR): a multicenter randomised controlled trial. Lancet. 2009;374:1351–63.
2. Schädler D, Miestinger G, Becher T, Frerichs I, Weiler N, Hörmann CH. Automated control of mechanical ventilation during general anaesthesia: study protocol of a bicentric observational study (AVAS). BMJ Open. 2017;7:e014742.
3. Núñez Reiz A, Armengol de la Hoz MA, Sánchez García M. Big data analysis and machine learning in intensive care units. Med Intensiva. 2019;43:416–26.

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4. Hollander JE, Carr BG. Virtually perfect? Telemedicine for Covid-19. N Engl J Med. 2020;11, http://dx.doi.org/10.1056/NEJMp2003539.
5. Gordo F, Abella A. Intensive care unit without walls: seeking patient safety by improving the efficiency of the system. Med Intensiva. 2014;38:438–43.

F. Murillo-Cabezas[a,*], E. Vigil-Martín[b], N. Raimondi[c], J. Pérez-Fernández[d]

[a] *Hospital Universitario Virgen del Rocío, IBIS/CSIC/Universidad de Sevilla, Sevilla, Spain*
[b] *Director Médico de Everis Health, Spain*
[c] *Unidad de Terapia intensiva, Hospital Juan A. Fernández, Buenos Aires, Argentina*
[d] *Servicios de Cuidados Críticos, Baptist Hospital of Miami, Florida, USA*

* Corresponding author.
E-mail address: franciscomurillocabezas@gmail.com (F. Murillo-Cabezas).